

REMARKS/ARGUMENTS

Favorable reconsideration of this application, as presently amended and in light of the following discussion, is respectfully requested.

Claims 1-8 are pending in the present Application. Claims 1-2 and 6-8 are amended by the present amendment. Support for the amended claims can be found in the original specification, claims and drawings.<sup>1</sup> No new matter is been added.

In the Office Action, Claims 1-8 are rejected under 35 U.S.C. § 103(a) as unpatentable over Coulson et al. (“A Statistical Basis for Lognormal Shadowing Effects in Multipath Fading Channels”, herein Coulson) in view of Zhao (“Multipath Propagation Characterization for Terrestrial Mobile and Fixed Microwave Communications”, herein Zhao I) and Zhao et al. (“Multipath Propagation Study Combining Terrain Diffraction and Reflection”, herein Zhao II).

The Office Action rejects Claims 1-8 under 35 U.S.C. § 103(a) as unpatentable over Coulson in view of Zhao I and Zhao II. The Official Action asserts that Coulson discloses all of the Applicants’ claimed features with the exception of, when generating time-varying propagation paths, if a shadowing object is present in the line of sight, a received electric field strength  $E$  is given as the summation of  $E_1$  that is an electric field strength of a first radio propagation path diffracted by a knife-edge at one edge of the shadowing object and  $E_2$  that is an electric field strength of a second radio propagation path that is different from the first propagation path and diffracted by a knife-edge at another opposite edge of the shadowing object. The Official Action cites Zhao I as describing this more detailed aspect of the Applicants’ claimed advancements, with the exception of “diffracted by a knife-edge at another opposite edge of the shadowing object” instead relying on Zhao II for this claimed feature, and states that it would have been obvious to one of ordinary skill in the art at the

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<sup>1</sup> E.g., specification, at least at Fig. 12 and pp. 30-33.

time the advancements were made, to combine the cited references to arrive at Applicants' claims. In response to this rejection, Applicants respectfully submit that amended independent Claims 1-2 and 6-8 recite novel features clearly not taught or rendered obvious by the applied references.

Claim 1 recites, *inter alia*, a time-varying multi-path generating apparatus for simulating multi-path fluctuations in radio communications, wherein

... when generating the time varying propagation paths, if a shadowing object is present in the line of sight, a received electric field strength  $E$  is given as the summation of  $E_1$  that is an electric field strength of a first radio propagation path diffracted by a knife-edge at one edge of said shadowing object and  $E_2$  that is an electric field strength of a second radio propagation path that is different from the first propagation path and diffracted by a knife-edge at another opposite edge of ***said shadowing object, which is located between the first and second radio propagation paths.***

As disclosed in an exemplary embodiment at Fig. 12, the shadowing object is physically located in between the first and second radio propagation paths.

Independent Claims 2 and 6-8, while directed to alternative embodiments, are amended to recite similar features. Accordingly, the remarks and arguments presented below are applicable to each of amended independent Claims 1-2 and 6-8.

As admitted at pp. 5-6 of the Office Action, the combination of Coulson and Zhao I fails to disclose that a received electric field strength  $E$  is given as the summation of  $E_1$  and  $E_2$  that are electric field strengths of radio propagation paths "diffracted by a knife-edge at another opposite edge of the shadowing object." Therefore, it follows that the combination of Coulson and Zhao I fail to disclose the more detailed features directed to the shadowing object being located between the first and second radio propagation paths, as recited in amended independent Claim 1.

In an attempt to remedy the deficiencies of Coulson and Zhao I, the Office Action relies on pp. 1204-1205 and Figs. 2a/2b of Zhao II, asserting that this reference “discloses and diffracted by a knife-edge at another opposite edge of the shadowing object.”

Zhao II describes a method for deriving a multiple knife-edge attenuation formula by combining diffraction and ground reflection. As described in section III on p. 1205 with reference to Figs. 2a/b, for example, Zhao II describes that each of the knife edges are defined as the mean diffraction at one end of a first shadowing object and at a second end of a second shadowing object, and so on. In the “Response to Arguments” portion of the Office Action, Figs. 2a and 2b of Zhao II are shown, and the Office Action points out the first and second propagation paths as being the two paths emitted from the transmitter T, which pass over the various obstacles H before arriving at the receiver R. The Office Action then points to the top of one of the obstacles where the plurality of propagation paths meet, then split again, noting “first and second propagation paths at different knife edges ... in this case opposite ends of shadowing object”. Fig. 1 of Zhao II actually shows a magnified view of the geometry of a flat topped obstacle with surface reflection.

Zhao II, however, fails to teach or suggest that the obstacle is “*located between the first and second radio propagation paths*”, as recited in the amended independent claims. Instead, as discussed above, Zhao II describes a multipath propagation environment in which the plurality of propagation paths each pass over a top surface of an obstacle. More particularly, each of Figs. 1, 2a and 2b of Zhao II clearly depict that each of the propagation paths pass over each of the obstacles, which extend all the way to the ground. Therefore, the obstacles in Zhao II could not possibly be located in between the propagation paths, since each of the paths must pass over the top surface of the obstacles.

Thus, Zhao II, neither alone, nor in combination with Zhao I and Coulson, teach or suggest that “... a received electric field strength E is given as the summation of E1 that is an

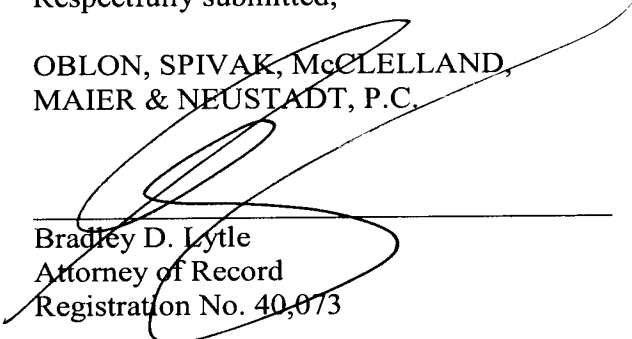
electric field strength of a first radio propagation path diffracted by a knife-edge at one edge of said shadowing object and E2 that is an electric field strength of a second radio propagation path that is different from the first propagation path and diffracted by a knife-edge at another opposite edge of *said shadowing object, which is located between the first and second radio propagation paths*", as recited in independent Claims 1-2 and 6-8.

Accordingly, Applicants respectfully request the rejection of Claims 1-8 under 35 U.S.C. § 103 be withdrawn.

Consequently, in view of the present amendment and in light of the foregoing comments, it is respectfully submitted that the invention defined by Claims 1-8 is patentably distinguishing over the applied references. The present application is therefore believed to be in condition for allowance and an early and favorable reconsideration of the application is therefore requested.

Respectfully submitted,

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